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## ORIGINAL ARTICLES.

### ON THE FREQUENCY OF ASTHENOPIA, ESPECIALLY IN AMERICA.*

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WE have long since agreed that the term asthenopia shall be used to designate that familiar group of symptoms which includes discomfort or pain for near work, with blurring of vision and perhaps some injection of the conjunctiva or lachrymation. But while we find this term convenient, it is also indefinite, especially so when we do not keep in mind the variety of asthenopia, whether accommodative, muscular or central.

I. Remembering thus the general character of the term, the first point to which attention is here directed is, that cases of asthenopia form one of the largest class we are called upon ordinarily to treat. Although this fact is so obvious, it is nevertheless difficult to demonstrate by figures, because the classification of diseases in institutions seldom or never include the term asthenopia. It is possible, however,

*Address of the President of the Medical Association of Central New York, at the Annual Meeting, 1901.

to approximate the number; for we know that nearly always asthenopia is associated with anomalies of refraction and of accommodation and with muscular insufficiencies, and therefore the proportion of these cases gives with certain modifications an indication as to the frequency of asthenopia. It is true that nearly all myopes and very many hypermetropes have no trace of asthenopia. But making allowance for these and also for those whose discomfort is trifling, there still remains so large a proportion of cases of really annoying asthenopia as to make that group, in every enlightened country, next in size to diseases of the conjunctiva and cornea. Indeed it is generally recognized that in private practice among the educated the cases of asthenopia constitute by far the largest class.

II. Again, it is apparently the fact that the more annoying types of asthenopia, the muscular and central forms, occur more frequently in the United States than elsewhere.

As the term asthenopia is elastic, it would also be difficult to state the frequency of such cases in figures. I am not aware that any attempt has been made to do so; but it is an observation familiar to those who have had opportunities to compare the hospital or private practice in this country with that of England, France or Germany.

It is not intended to state that the average American is not as strong in other respects as his brother across the Atlantic. The contrary has been shown, as is well-known, by Dr. P. C. Knapp and others. Dr. H. P. Bowditch has found from measurements of the American school boy that he is as good a physical type as the boy at Eton or Rugby. Dr. B. A. Gould in like manner found that our soldier was the physical equal of the European. Our athletes bring back at least their share of prizes from abroad, and our yachtsmen have held the cup for over fifty years.

But, on the other hand, Javal has expressed the opinion to Roosa that asthenopia is more common in New York than in Paris, and this also held by Bull of Paris, whose extensive practice first on one side of the Atlantic and then on the other has afforded unusual opportunities for observation.

Important evidence on this point is furnished by Dr. George M. Beard in a monograph on Nervous Exhaustion and

Neurasthenia, published so long ago as 1879. Most of the cases which he described are really types of asthenopia.

In the first chapter he says: "There is a large family of functional nervous diseases which are increasingly frequent among the indoor classes of the civilized countries, and they are especially frequent in the northerly and easterly parts of the United States."

The observations which compose the greater proportion of his monograph are carefully made and systematically arranged, and although some of the views must necessarily be modified by the light of subsequent investigation, the conclusions which he reaches seem to be entirely warranted.

He observes that the geographical distribution of this class of diseases is not everywhere the same. They appear to be less common in Germany and Russia, Italy and Spain; more frequent in France, and still more frequent in England. Above all, he considers neurasthenia to be an American disease, and in that definition he includes, as before remarked, what we all recognize as forms of asthenopia.

The late Dr. Henry D. Noyes of New York presented, as long ago as 1876, an analysis of 1079 cases which came under his observation—rather a large number even for an industrious practitioner.

Personally, as I compare the experience of twenty-seven years' practice here, and that obtained during ten visits among our confrères in England and on the continent, the impression becomes stronger, as before remarked, that such cases are decidedly more frequent in the United States. Moreover, it is natural that this should be so, for the following reasons:

(*a*) *Carelessness.* — Americans use their eyes more under unfavorable circumstances than is done elsewhere. Our newspapers and periodicals are many times more numerous and larger than in any European country. The print is often poor; we read more when travelling, or wherever we happen to be in our few minutes of leisure, too frequently regardless of proper illumination or other requisites for the natural use of the eyes.

(*b*) *From causes affecting the nervous system.*—It is a saying with the Europeans that while he makes money to

live, the American lives to make money; and however that may be, the hurry and mental strain of our American life makes greater demands upon the nervous system than does the more quiet routine of life elsewhere. This fact also is so well recognized as to require no comment.

(*c*) *From causes affecting the digestive tract.*—It is probable that this is of some importance. Americans not only eat more meat than do Continental nations, but we do not take time to masticate it properly, and there may be an insufficient amount of fluids ingested as compared with that in wine or beer drinking countries.

The fact that dyspepsia in various forms and appendicitis are so common in America, also indicate that there is some factor here which exerts an unfavorable influence upon the digestive tract and indirectly thus upon various organs.

III. Even if there should be a doubt that annoying forms of asthenopia do occur more frequently in the United States than in Europe, there is no doubt concerning another phase of this subject, which is, that a larger number of these asthenopic persons do apply for relief in the United States than elsewhere. This is especially apparent to German or English ophthalmologists who are so situated as to have a clientèle including many Americans.

Thus, one of our most honored and illustrious confrères, located in a German university town, which happens to be also a resort for Americans, said to one visitor: "Your American eye doctors frighten patients into glasses, and the patients frighten themselves about them." In spite of an opinion from so distinguished an authority, it would seem that there are other causes which induce patients in America to seek relief sooner than elsewhere. These are:

(*a*) The mental attitude of the average American in regard to glasses. He desires to see as distinctly as he can and prefers the inconvenience of glasses to any discomfort from asthenopia. This is true of American women also, young or old. This is even true, to as great an extent as is possible, of those other women of rather uncertain age, who naturally fear that the possession of a pair of glasses indicates that they are approaching middle life.

Especially is this objection lessened when the optician

assists in the self-deception by making the eye glasses becoming or even ornamental.

(*b*) The average American practitioner is better supplied with appliances for detecting the causes and varieties of asthenopia than are his confrères in Europe.

In addition to the all-important test case, we find now almost invariably that he is equipped with an ophthalmometer, with a phorometer, together with other appliances for testing the static and dynamic conditions of the muscles, and occasionally has appliances for measurement of relative accommodation, which in Europe are to be seen only in a physiological laboratory.

When an American ophthalmologist visits his professional brethren in their offices in Germany, he is struck by the lack of appliances for properly testing this important class of cases.

(*c*) American ophthalmologists use these appliances to make more accurate corrections of ametropia and of muscular anomalies than is customary in Europe.

It may seem strange that the countries which have produced Helmholtz, Graefe, Donders, and Javal should not also be those to carry into practice the important lessons taught at home. Apparently, however, that is not the case.

It required some time for American ophthalmologists as a class to be convinced that the correction of half or even a quarter of a dioptre of astigmatism was of any importance. Gradually, however, the majority have reached that conclusion. We have learned that attention to the details of ametropia and of heterophoria, apparently insignificant, make all the difference, in some few instances at least, between persistent headaches and perfect comfort.

(*d*) The skill of the optician assists to no small degree in the treatment of these cases of asthenopia. In nearly all of our cities of any considerable size we now find one or more opticians who themselves grind spheres and cylinders accurately and promptly, setting the glasses in frames which are neat and comfortable.

They have long ago learned to make bifocal lenses, so that certain hypermetropes or myopes who have passed middle life find such lenses one of the essentials of comfortable existence. And yet, even this simple appliance is exceptional in a country

where the theory of optics and the skill of the workman otherwise is as far advanced as in Germany. During the last year the writer of this, who wears bifocal lenses, happened to attend the meeting of the German Ophthalmological Society in Heidelberg. Such glasses were so unusual as to attract attention, and several of the members did not hesitate to express their curiosity by inquiries concerning them.

We must conclude, therefore, that cases of asthenopia form not only one of the largest group which we are called upon to treat, but that the proportion of severer cases is somewhat larger in America than in other countries, this being due to the injurious effects of our national habits upon the eyes themselves, upon the nervous and digestive system.

Also it seems quite certain that a larger proportion of all the cases of asthenopia apply for relief in the United States than do so elsewhere, the reasons of this being the comparatively slight aversion of patients to the use of glasses; to the fact that the average American ophthalmologist is better equipped than his foreign confrères for detecting errors of refraction and of muscular balance; that he takes pains to correct even small variations from the normal condition; and that the American optician has much more complete appliances for grinding glasses accurately and fitting them satisfactorily than has the average optician of any other country.

# DACRYO-STENOSIS WITH ABSCESS.*

BY DR. J. F. REYNOLDS,
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DACRYO-STENOSIS with abscess is the most important disease of the lachrymal duct. Not only does it give rise to grave affections and sometimes fatal septicemia, but in consequence of its tendency to cause congestion of the conjunctiva and appendages of the eye, it undermines the whole nervous system and unfits the patient for the ordinary avocations of life. It is nearly always secondary to dacryo-cystitis, the development of which is favored by foreign substances, as dust, smoke, irritating gases, etc.

Blennorrhœa adultorum and blennorrhœa neonatorum play a very important part in the causation of this disease, for they almost invariably leave cicatrices sufficient to cause stenosis of the duct, which is sooner or later followed by abscesses. According to "Fuchs," heredity undoubtedly causes a small per cent. of these cases, from ill-formed noses, which are handed down from one generation to another. It is often caused from hypertrophy of the inferior turbinated, especially in those who suffer from specific troubles, either acquired or congenital, and from all nasal affections where the pathogenic fungi enter the nose. It occurs in all classes and at all ages, but chiefly in men of mature years, and especially employes of our various factories and railroad systems. It is by far the most frequent between the age of twenty-five and fifty years. Males are attacked more often than females, and women of the higher classes who are not subjected to hard labor rarely suffer from this disease. Chronic alcoholism is a causative factor, for the reason that it produces chronic congestion and catarrh of the lachrymal duct, and thickening of the mucous membrane and connective tissue. Necrosis of the lachrymal and nasal bones is also a frequent cause of the abscess. Its course is a very rapid one. Usually on the third or fourth day we can detect pus by palpation and the discoloration of the skin.

After a brief mention of some of the most important symptoms, we will hasten on to the consideration of the treat-

*Read at the meeting of the Western Ophthalmologic and Oto-Laryngologic Association, held in Cincinnati, Ohio, April 11-12, 1901.

ment. (1) Epiphora is almost the first symptom to appear; (2) redness and heat; (3) swelling, at first hard and painful on pressure; (4) great œdema of the lids and surrounding tissue; (5) congestion of the conjunctiva with chemotic patches; (6) dryness of the schneiderian membrane and the corresponding side of the nose seems to be stopped up; (7) non-permeability of sac; (8) fluctuation makes its appearance on the third or fourth day; (9) lachrymal sac can easily be outlined after it is distended with pus; (10) in order to ascertain as to whether or not there is complete occlusion of the duct, it is best to inject a few drops of a normal salt solution into the lower canaliculi with a small lachrymal syringe, and if there is an opening it will enter the nostril of the corresponding side.

The treatment should be directed in two ways, viz.: to kill the micro-organism and remove the obstruction. In the beginning of the abscess, that is during the first two or three days, we should use abortive means, such as irrigation and syringing with antiseptic solutions, the use of astringent fluids, of which a one per cent. solution of silver nitrate acts admirably; ice bags alternated with hot applications are beneficial when the patient will tolerate them.

The Bowman probe should rarely be used unless it is in the hands of one skilled in its use, and then the tissue should be thoroughly cocainized in the region of the duct by injecting the cocaine into the canaliculi with a small syringe. If the stenosis is marked, the duct and surrounding tissue should be anæsthetized by hypodermic injection of a four per cent. solution of cocaine, or better still the use of a general anæsthetic; for Dante has never pictured the horrors of the lost souls with more anxiety and dread than these poor sufferers show when they are about to be subjected to this painful little operation. If the stricture is hard and of long standing, the probe should not be forced through without first cutting it, and never used when the inflammation is very great, for by its use we are liable to make a false passage and produce a solution of the continuity of the mucous membrane, which leads to the formation of cicatrices and impairs the function of the tear passage. Injection of medicine into the canaliculi is not without its bad effect on the future course of the dis-

ease, for it acts as an irritant to the lining mucous membrane, increases swelling, extends suppuration and thereby prolongs the duration of the disease, and makes an unfavorable prognosis. The radical operation should be performed as follows:

Make an incision through the skin and subcutaneous tissue—beginning at the center and at the lower margin of the tendo-oculi—extending downward and outward about one inch, so that the lower part of the incision will be on a line with the inner schlero-corneal border of the normal eye; dissect back the skin and subcutaneous tissue, and with a pair of strabismus scissors make a complete dissection of the lacrymal sac and duct from where the latter enters the osseous canal up to the bifurcation of the canaliculi. The remaining portion of the duct down to the pituitary membrane should be incised in several directions by means of a narrow knife of the shape of a right angle triangle, as recommended by "Stilling," by allowing the knife to move up and down several times, rotating it on its axis after the sac and nasal duct have been completely removed, take a medium sized Bowman probe, pass it into the canaliculi through the puncta lacrymalis until it is felt in the wound by the tip of the finger, then place the point of an electric cautery probe, about the same size, in apposition with Bowman's, gradually withdraw the latter, at the same time following it up with the cautery until it is seen in the puncta, turn on the electric current until this probe reaches a white heat, at the same time guarding against any injury to the eyeball and surrounding tissue. After having carefully removed it we have a wound that is absolutely free from all germs and their toxines and a tube without any lining mucous membrane, the sides of which readily come in apposition and heal by granulation; therefore we have substituted for these infectious canals a cicatricial tissue that is firm and healthy, and thereby have destroyed the incubator for all bacilli that so easily migrate to the inner canthus of the eye; besides, these patients are permanently relieved from the unpleasant task of squeezing the tears from the mouths of the canaliculi, as usually happens when the ducts are allowed to remain open. I am a great believer in palliative treatment and conservative surgery, but I think it out of place in a case of dacryo-stenosis of long standing with

a recently developed abscess; for in every case of this character we should neither delay nor hesitate to perform the radical operation as soon as the diagnosis is made, and even before the abscess has ruptured spontaneously or opened with the knife. If the sac is fully distended with pus we can in a great many cases, by careful dissection, remove it without rupturing the sac, which gives the operator a much better chance to make a complete removal without injuring too much of the surrounding tissue. There should be a total extirpation of the lacrymal gland, as recommended by "Dr. Holmes," in almost every case where the duct and sac have been removed, especially in those persons who lead an outdoor life and are constantly subjected to the wind and dust; for if this gland is not removed these patients are annoyed for life by tears and conjunctivitis caused by the constant wiping the eyes. I do not claim anything new in the cautery treatment, for the application of cauteries in their various ways in this operation are as old as the surgery of the sac itself; but the results obtained in the cases upon which I have operated by above described method convinces me that the application of the cautery into and through the canal fulfills all the requirements. One advantage it enjoys over the slitting method practiced by some is the conservation of symmetry and form to the palpebral margin, which results could not be so easily or surely obtained after an open wound. I quote you three cases which have come under my observation during the past eighteen months:

Case I.—T. F., æt. 58, male, applied for treatment November 19, 1899, with the following history: Was kicked on the nose by a horse June 18, 1890; had considerable redness, pain and swelling for several weeks afterwards. When the inflammation subsided, the lacrymal duct was stenosed and the tears were continually overflowing, causing no little inconvenience. In 1896 the sac abscessed, at which time he consulted a reputable specialist, who operated and removed a small quantity of necrosed bone, and directed his after-treatment to the use of Bowman's probes and syringing the duct with antiseptic solutions. This treatment was continued for three months, when the patient was discharged cured; still more or less tearing continued until November, 1899, when the second abscess

made its appearance. After six weeks of careful syringing and probing, without any marked benefit, I performed the radical operation under a general anæsthetic, removing the entire sac and duct, with a small amount of necrosed bone, from the pituitary membrane to the bifurcation of the canaliculi; then with the electric cautery point I carefully cauterized the canaliculi to the margin of the lid, applied two silk sutures, dressed it antiseptically, had primary union in the lower part of the wound, the canaliculi healed by granulation. Complete recovery.

Case II.—B. J., æt. 42, male, first consulted me August 5, 1900, with history of having had stenosis with muco-purulent ectasia of the lacrymal sac of the right side for the past six months. Three days prior to my seeing him an abscess had begun to form, with all the symptoms common to this disease. I proceeded at once to do the radical operation, under cocaine anæsthesia, observing strict asepsis. I made a complete dissection of the sac and tube, using the cautery point as in Case I. After taking two deep catgut and two subcutaneous silk sutures, the wound was antiseptically dressed, union taking place by first intention in the lower part, the canaliculi healing by granulation. This patient, being a farmer by occupation, was continually annoyed by the excessive accumulation of tears caused by wind and dust, and being willing to submit to almost anything to get relief, I removed the tear gland October 20, 1900, after having shaved the entire eyebrow and made every preparation for an aseptic operation. Primary union and complete recovery followed, with sufficient tears to lubricate the membrane of the eye.

Case III.—J. C., æt. 65, male, twenty years ago suffered from purulent ophthalmia for about one year; since that time he has been more or less troubled with tears running over the lids and flowing down the cheek in sufficient quantity to irritate the skin. December 1, 1900, an abscess developed, and four days later I was called and made an incision, and a large quantity of pus was evacuated. I washed it out with $H_2O_2$ and other antiseptic solutions, and continued this palliative treatment with but little benefit until January 3rd, when, under cocaine anæsthesia, I removed the sac and tube, cauterizing the canaliculi. The union in this case was the same as

the above cases, and the patient was apparently well until three weeks later, when a subcutaneous abscess made its appearance, which was opened and washed out with a two per cent. solution of silver nitrate. Recovery uninterrupted; patient well, but still greatly inconvenienced by the accumulation of tears.

DISCUSSION.

Dr. F. A. Phillips, Chicago.—I would like to say a word or two in reference to the conservative treatment of these cases, especially the cases of blennorrhœa of the sac which have not as yet developed the acute suppurative condition; in other words, those cases in which an abscess proper has not developed. It is in these cases that we get early the symptom of epiphora, and it seems to me at this time that conservative treatment is advisable. If seen thus early dilate the punctum, then with Anel's syringe or a lacrymal pipette, wash out the sac carefully, and if the solution passes through into the nasal cavity do not pass a probe. It is and has been my practice for the past two years to probe no case for at least a period of two or three months, and if I find then the epiphora continues, and the stenosis of the puncta is not relieved by dilatation, I take a pair of Stevens' tenotomy scissors, and after introducing one blade within the canaliculus make an incision from one and one-half to three millimetres in length. If the punctum is inverted—that is, rotated toward the eyeball—I turn the outer blade so that it points outwards towards the outer border of the lid in order that the incision may pass obliquely across and leave an opening into the canal lying in the lacus lacrymalis. I have found by this conservative method of treatment that many of these cases will be relieved and go on to recovery. Where cases have gone on to the condition in which a chronic suppurative process is present it is important to obtain an opening, a large one, and keep it open. This can best be done by inserting a stylet or the probe mentioned by Dr. Kyle. In two such cases as have just been described, I had to operate because I was not able to relieve the patients of the suppurative process by treatment. The probe if passed continually would maintain the patency of the canal, but after a discontinuance of from one

to three months they would return with the suppuration and epiphora; I should have considered them fortunate if they had only epiphora. In the majority of cases of chronic suppurative dacryocystitis one of two things will result: either suppuration ceasing, contraction takes place with the closure of the duct so that epiphora is constant, or the suppurative process recurs and the patient will have to apply again and again for treatment. Such has been my experience. I have seen these cases recurring year after year, and they would come back once or twice a year for treatment; so my experience has made me very conservative in the matter of passing probes. I have seen a number of cases of suppuration produced by the early use of the probe where there had been prior to its use but a simple blennorrhœa of the sac. For that reason I wish to call attention particularly to the conservative treatment: first, by using dilatation of the punctum and the flushing out of the apparatus with a saturated solution of boracic acid; and second, avoiding the use of the probe until such time as you are confident stenosis exists in the lower part of the apparatus, in the bony canal.

Dr. S. C. Ayres, Cincinnati.—In regard to the treatment, I have pursued the methods which most of you have adopted—washing out the tear sac and then treating it, dilating the canaliculi, passing a probe into the nose before making an operation. I do not believe, however, that I have been quite as fortunate as some of you in treating obstructions in this way, for after my patients were apparently well they would occasionally come back with a return of the epiphora; and in these cases I simply slit the upper canaliculus, pass a probe, and in a little while the patient is well. I have very positive ideas in regard to slitting the canaliculi, and it is surprising when one looks up this subject in the text-books to find how different authors recommend slitting, sometimes the upper and again the lower canal. Anyone who operates upon the lower canaliculus knows how much twisting of the tissues one has to make in order to get into the sac, so I do not think one is ever justified in operating through the lower canaliculus unless he cannot for some good reason utilize the upper.

Dr. J. F. Reynolds, Mt. Sterling, Ky.—I do not feel that it is necessary for me to enter into further discussion of

this subject. The able discussion of the papers of this symposium to which I have listened, by such eminent teachers and practitioners, have been to me personally a source of great satisfaction, besides they have brought out a number of points of very valuable information, which will be beneficial to me in the future.

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## NERVE RESECTION, AS APPLIED TO THE SUPRA-ORBITAL AND NASO-LACRYMAL BRANCHES OF THE FIFTH PAIR.*

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THE surgical procedure indicated by the above title seems to have passed out of the minds of the operators of the present day and to have been relegated to the dump-heap of technical science, so to speak, and to have been replaced by improved modern methods which have had a tendency to draw the attention of the surgeon away from the orbit and the eye, and center his base of attack on the nasal vault as the seat of the enemy's stronghold in the vast majority of those aggressive and painful reflex neuroses which still go under the general appellation of orbital and supra-orbital neuralgia. We hear much and see a great deal of optico-ciliary neurectomy, and doubtless in many cases we meet with some very good results from this operation. The more difficult and vastly more dangerous operation for the resection of the superior cervical sympathetic has become a popular operation for the radical cure of those disorders to the visual apparatus, having for their initial cause a preponderance of intra-ocular pressure, and passive congestion, so to speak, in the capillary circulation, which is controlled by the vasomotor system of nerves in and about the uveal tract and ciliary body, the result of which we see in the expression of pain, more or less rapidly decreasing visual acuity, and tension of the globe. If we, in our zeal, sometimes allow fashion to influence us, we may be able to bring our minds readily to the adoption of an operation like optico-ciliary neurectomy, where the arguments *pro*

*Read at the meeting of the Western Ophthalmologic and Oto-Laryngologic Association, held in Cincinnati, Ohio, April 11-12, 1901.

and *con* are not so unevenly divided. The successful severance of all interconnection between both globes, so far as nerve influence goes, would afford us a plausable reason why we should prefer this operation to complete enucleation as a means to prevent sympathetic irritation and sympathetic inflammation, because the cosmetic effect is so infinitely preferable to that of enucleation or even evisceration, to say nothing of the permanent life-time burden and annoyance and expense of the prothesis.

Whether it be from prejudice or bias, or lack of popularity, or for the reason that failures have attended the resection of the branches of the fifth in the orbit, where the operation has been made on unsuitable cases, it is not in the province of this paper to determine, neither is it the purpose of the writer to champion any pet procedure of his own; but simply to call attention to a few points which seem to indicate that the resection of the supra and infra-orbital, and the ciliary connection between the fifth and the globe by the nasal branch, and the branch which supplies the tear gland, may, in suitable cases yield us results which justify us in selecting this simple and easy, and almost harmless procedure under certain condition.

Badal[1] has called attention to the operation of elongation, or "*arrachement*" (really tearing out) of the branch which he calls the external nasal, for the treatment of certain forms of ciliary "douleur," which seem to have their origin and point of depart in the globe. He sets aside as manifestly inconsistent, first, all those acute and some chronic forms of complaint, the pathology of which is apparent, such as the different forms of iritis, keratitis, choroido-retinitis, etc., and cites three groups of cases etiologically distinct, which seem to him to offer suitable reasons why this operation should be performed: "First, those painful affections which are purely and simply the expression of a neuralgia of the trigeminal nerve, not accompanied by any appreciable pathological complication in the globe. Second, those which result from certain affections traceable to the tunics of the eye, in particular the ciliary region and the uveal tract, where we have hyper-

[1]Badal. Gaz. Heb. des Sciences Med. de Bordeaux, 3 et 17, Dec. 1881. Annales d'Oculistique, Tome XC., p. 89, etc.

æmia and engorgement, with compression on the filaments of the terminal branches of the nerves not distinctly necrotic or inflammatory in character, yet having a tendency to inhibit normal physiologic metabolism. Third, those painful phenomena which may be recognized as having an origin in some way connected with pressure on the ciliary nerves in the globe where the departure from normal intra-ocular tension is easily made out. Occasionally we note the increased depth of the anterior chamber. Later there may occur a primitive or secondary glaucomatous process arising as a factor or as a sequel to the above, and in many instances which of the two conditions is the true one we cannot always determine." "Everyone," continues this author, "recognizes the vaso-motor, secretory, and trophic functions of these orbital nerves in question; every one knows that ciliary forms of neuralgia are almost constantly accompanied by a hypersecretion of the lacrymal gland, by a hyperæmia of the ocular mucosa, by an increased flow of the nasal discharges apart from the tears, and by general trophic disturbances throughout the ophthalmic zone."[2] Chauval proposed to choose the external nasal nerve as the one most appropriate upon which to perform the operation of resection for the purpose of combatting such neuralgias as were accompanied by profuse lacrymation, photophobia and peri-orbital pain. He claimed that this branch in question not only was most to blame, but that because of its double connection with the tear gland upon the one hand, and the ethmoidal sinus on the other, its "arrachement" would cut off the source of nerve supply to these regions and inhibit algesia; besides it was an operation fairly safe and easy to perform, and conservative in nature, and would always leave the surgeon ample time to undertake any of the more dangerous operations (iridectomy, sclerotomy, paracentesis, etc.) later, in the event it became necessary. Besides it is an operation the anatomy of which is not difficult nor complex. The nasal nerve, after having given off the ciliaries direct and the sensitive root to the ophthalmic ganglion, divides into the internal nasal and the ethmoidal; this is the supply to the anterior nasal and ethmoidal region, while the external is the main part of the nerve as its continuation supplying the con-

[2]Chauval. Archives General de Medecine, Aug. 1881.

junctiva, the mucosa of the nasal sac and canal, the palpebral region, etc. The manner in which the main trunk is to be found near its bifurcation, or where it is large enough to serve the purposes indicated, is as follows:

"Place the index finger upon the globe immediately beneath the margin of the orbit, the palmar surface in front, and the extremity of the finger resting against the angle of the nose. The point of emergence of the nerve will be found to be located exactly beneath the center of the margin of the nail."—ABADIE.[3]

The primary incision is to be made with a bistoury, and the dissection finished with blunt hooks or the back of the knife; usually a small plexus of vessels accompany the nerve, which are to be separated and the nerve is to be drawn slowly from the orbit, tearing it away at as great a depth as possible so as to get out the deeper portion and sever the ethmoidal connection as well as the connection with the ganglion.

The supra-orbital is so easily found that one need not to stop to describe the technic of this operation. Usually the writer has simply cut down on the supra-orbital notch and passed a strabismus hook under the orbital aspect and readily found the nerve. When the notch was in the form of a foramen, he has cut out the anterior portion of the notch with bone forceps or a small chisel, and liberated the nerve so as to get out quite a quantity from the corrugator, backwards, and having seized the orbital trunk well in the orbit made steady traction until the nerve stretched considerably before finally breaking deep in the orbit; in this way about two inches in length can be successfully removed. The small wound is dressed antiseptically and closed with one or two small sutures, or may even be sealed up with plaster. At the end of forty-eight hours the union is complete per primam.

In one case operated upon a few months ago the writer found what appeared to be two supra-orbital notches, and two nerves emerging from them, in the same subject on one side, the side affected, while on the opposite side the orbit showed but the one supra-orbital notch. Both of these nerves seemed extremely tender to touch. The patient, a lady, had had se-

[3]Abadie, Arrachement du Nerf Nasal, Annales d'Oculistique, Tome LXXXIX., p. 234.

vere supra-orbital neuralgia for many months, even years. Both these trunks were attacked, and from an inch and a half to two inches of the nerve trunk withdrawn from each. The part excised had the appearance of nodular irregularities and swellings along the course of the bundles, and from this appearance I concluded that there had been in these nerves more or less neuritis, which probably gave rise to the pain.

My first experience with resection of the supra-orbital nerve may be said to have originated in an accident. Sometimes mere trifles exercise great influences in determining the outcome of a case, and certainly this one was not an exception to that rule. It occurred ten years ago. A lady, Mrs. M——, in somewhat humble circumstances, rather poorly nourished, and afflicted with one of those perennial ophthalmias, had applied to me at the city hospital for relief every year at the beginning of my service for several years. During the three months she was under my care I found that she made some improvement, when she would pass out of my care, and be seen no more until the next season. Sometimes in the intervals she would come to the office with her relapses, and they were all of the same character. The eyes were always fretful, there was much weeping, photophobia, pain, and hyperæmia. The old chronic granular conjunctivitis had run its course for ten years. There was some contraction of the tarsi, and some cicatricial deposit throughout the mucosa of the lids; the pannus was never very dense; it was more of the thin nebular variety. Astringents usually toned up the conjunctivæ, and good nourishment and indoor life as a rule benefitted her, and with proper attention to her bowels, which were constipated, she would always improve; but as soon as she became sufficiently improved to leave the hospital she would relapse and for the remainder of the year spend her time between the different outdoor clinics, never cured and always suffering.

At the time mentioned I noticed a small round hard elevation of the size of a pea, right above the supra-orbital notch of the right eye. This was extremely sensitive to touch. At first I took it for a small varix; but upon somewhat closer examination, and from the very great sensibility on touch, I came to the conclusion that it was a bead-like enlargement of the

nerve-trunk, and it seemed to be long instead of round and extend into the canal. I advised her to have this small tumor removed, not really thinking that it had much to do with the case, but as soon as I came down upon the nerve, which it proved to be, I determined to resect as much of the nerve as I could, and consequently took out nearly two inches of the nerve, which was quite irregular, and had several nodular enlargements throughout its course. The case made an uneventful recovery, healed by first intention, and to my surprise the pain and weeping seemed to have disappeared by magic. She remained in the hospital some weeks after the operation, and left in better shape than at any other previous epoch. In three months afterwards she came to my office, and I scarcely knew her; her eyes seemed to have entirely recovered; the corneæ had cleared completely, and she had no more pain and scarcely any tears. The correction of her astigmatism gave her good vision, and she has remained without any further treatment, quite comfortable, for now ten years.

After that I began to look for such cases, and have made a number of such operations with happy results. This winter I encountered another similar case; one where I had recommended the operation some three years ago, but which was refused. The case had passed out of my memory. She introduced herself by stating that she had come for the purpose of having her orbital nerve removed, as I had recommended. I then recalled the case. Upon examination I found this nerve, which was the right one, excruciatingly tender. The upper eyebrow was drawn up and showed violent contraction (elevation) of the corrugator or rather the frontalis muscle. The side of the face participated in the spasm. She stated that she had had frontal headache and neuralgia for five years, had taken all kinds of medicines; and her physician, who telephoned me, stated that the case was a nuisance to him and had given him endless trouble, and that he had sent her with the hopes that by resecting the supra-orbital nerve she might find relief. Accordingly I sent her to the hospital and operated, keeping her there two weeks. The nerve was easily found. I took out the portion above the notch up to the several divisions and got out from a half inch to an inch of three short branches above the eye, and then cut the bony canal or foramen open with a chisel, made some

stripping backwards into the orbit till about two inches of the trunk was exposed, then with blunt forceps made traction until the nerve broke off rather deep in the socket. The case healed nicely, and so far she has had but little trouble. She now says that her eyebrow and forehead on the right side have a sensation of cold, feel numb and chilly all the time, but that she has had no more neuralgia. It would seem that in her case also that a good result had followed the operation.

DISCUSSION.

Dr. Adolf Alt, St. Louis.—While I have had no occasion to make a similar operation for neuralgia, I think a case in which the good primary result of the neurectomy is maintained for ten years is a very fortunate one. I have had occasion to make neurectomy of the supra-orbital nerve, as well as the infra-orbital one, for other reasons, and I have always found that, although I excised pieces of from 1 to $1^1/_2$ inches in length, reunion of the nerve took place after a shorter or longer interval, and with re-establishment of conduction the former symptoms returned, and it was very lucky if they did not assume the severity which had brought about the operation. In one case of blepharospasmus (see *American Journal of Ophthalmology*, Vol. VI., p. 332) I excised both the supra-orbital and infra-orbital nerve on both sides, and yet the symptoms returned after a while, though not with the former severity.

Dr. Derrick T. Vail, Cincinnati.—I encountered a case recently which because of its unusual interest I would like to relate. The patient had been suffering great pain in the right supra-orbital region for several years. The attacks were intermittent and irregular. During the attacks the man suffered excruciating pain. There was slight exophthalmos of the right eye. Photophobia, lacrymation and ocular congestion were also present. He belonged to the German type, was stocky in build, sanguine in temperament, with no signs of neurasthenia nor hysteria. I do not think there is any doubt about his suffering agonizing pain. At the periods when he would have these attacks of pain he would develop a suicidal mania and had to be closely watched, as it was feared he would destroy his life. Some years ago Dr. Holmes had opened up his right sphenoidal cavity and for two years he enjoyed free-

dom from attacks of supra-orbital neuralgia. Recently, within the last nine months, he had a recurrence of the most violent character. He came to me requesting that I open up his sphenoidal cavity again. I examined his nose carefully, but failed to find the slightest evidence of sinusitis. The mucous membrane covering the turbinated bones was somewhat boggy; but that was all, and I did not feel justified in curetting, so I simply temporized, using arsenic, aconitine, quinine, leeches and blisters, hoping to relieve the patient without an operation. He went from bad to worse and finally had to have hypodermic injections of morphine to relieve his suffering. Of course I was unwilling to continue the morphine treatment, fearing the habit, and in a day or two was compelled to say that the only thing I could suggest was a resection of the supra-orbital nerve. He readily gave his consent to this. He was anæsthetized and an incision made over the exit of the nerve on a line with the brow and the edge of the orbit. The nerve was readily found. I hooked it up with a tenotomy hook and found that it had divided into some four or five branches before reaching the foramen. Being anxious to get all the branches, I dissected back into the orbit as far as I thought I could safely go, and then grasped the nerve, as the Doctor has described, with a small pair of hemostatic forceps, pulling steadily on it with slow and regular turns. I could feel the nerve stretching more and more, and finally succeeded in tearing it out of the orbit. I then tore out the terminal nerve strands, and as I pulled I could see the skin wrinkling along the course of the nerve as far up as the line of the hair above the forehead. The relief from the acute pain was instantaneous. The healing was by first intention and occupied but five days' time. That was about nine months ago. Three weeks ago he came back to me and said he was troubled again with pain which, while not in the supra-orbital region, seemed to be in the back part of the eye and in the temple. The area around the brow was entirely numb and free from pain. He had an anxious expression, the eye was suffused with tears, and there was a good deal of photophobia. I confess I did not know what to do. He clamored for a nasal operation, but upon examination the nose appeared to be normal, except the membrane had the same sort of boggy appearance previously mentioned. I cocainized the

nose, and to get the mucous membrane contracted to the bone used the suprarenal extract, and at the same time removed most of the middle turbinated bones. I went on back toward the cavity of the sphenoid and curetted gently, cleaning it out as best I could. He came back daily for treatment. On the third day he said that something had suddenly burst in his nose. I made an examination and found the upper straits of the nose full of a creamy secretion that came down from the nasal attic. He expressed great relief and seemed to think it unnecessary after that to come for treatment, as he was entirely relieved.

This then was either a case of hysteria, true neuritis, or else of empyema of the sphenoidal cell. I am rather inclined to think it was a case of sphenoiditis. The ophthalmoscopic examination and field of vision were normal, but through these attacks the patient complained a great deal of obscured vision.

Dr. M. F. Coomes, Louisville.—I have been very much interested in the paper just presented, and when I get home I think I shall try this operation on a case. The case is an ideal one for operation — a young lady, 26 years of age, who has suffered similarly to the case described by the Doctor. When she gives strict attention to her diet she is better, but with inattention to this matter she lapses back again. At the menstrual times she seems to be worse, but I do not think this cuts much figure. I want to thank the Doctor for reading the paper, as it deals with a subject which we do not find in books, and I hope he will keep us posted in the future as to his results in these cases.

Dr. J. O. Stillson, Indianapolis.—As I stated in my paper, I felt that I must be cautious in presenting a paper of this kind before this learned body. I knew I was treading on dangerous ground in offering a paper on the resection of the supra-orbital nerve, because we all know of the old operation which was done away back years ago and left abandoned alongside of the operations for resection of Meckel's ganglion for tic douloureux. I watched this one case for ten years before I felt justified in saying anything about it, and then having run on to these other cases which I treated, I concluded I would write this paper and present the cases for what they were worth.

# MEDICAL SOCIETIES.

## PROCEEDINGS OF THE OPHTHALMOLOGICAL SOCIETY OF THE UNITED KINGDOM.*

*Friday, July 5th, 1901.*

G. Anderson Critchett, M.A., F.R.C.S.E., President, in the Chair.

### Blindness Resulting from Sodium Salicylate.

Mr. Simeon Snell related the following case: The patient, a girl, suffered from acute articular rheumatism, for which sodium salicylate was prescribed. She awoke from sleep at 7:30 A.M. and said that everything was dark in front of her. At the medical attendant's visit between 11 and 12 he found her unable to distinguish between light and darkness. The next day Mr. Snell saw her and found her perfectly blind. The ophthalmoscope disclosed nothing abnormal in either fundus. The following day he again saw her, when she was succumbing to pericarditis with endocarditis. Again nothing abnormal in either fundus was detected. There was no return of vision, and she died that same evening. It was calculated that the total quantity of sodium salicylate taken must have been 140 grains, if not 160 grains, in sixty hours.

Mr. Snell said he thought that there could be very little question that the sodium salicylate was the cause of blindness in this instance. The number of similar cases recorded was very limited.

### Sarcoma of Conjunctiva.

Mr. J. B. Lawford reported further notes of a case of sarcoma of the conjunctiva. The patient was a woman whose conjunctiva showed marked and increasing pigmentation when she was shown to the Society on June 11th, 1896. In July, 1896, two pinkish nodules appeared. In August, 1896, the cornea became hazy and the conjunctiva raised. In October, 1896, the eyeball and conjunctiva were removed, and were

*British Medical Journal.

examined by Mr. Devereux Marshall, who reported the growth to be a pigmented sarcoma. The pinkish nodules consisted of connective tissue, cells, and blood vessels. There was no growth whatever within the eyeball. In May, 1897, the patient had a serious illness with brain symptoms, and it was thought an intracranial growth was present. However, she got better. In October, 1897, some new growth was seen in the orbit, and the general health was not good. In October, 1897, the growth was removed and was examined, and found to be a sarcoma. In August, 1898, another recurrence was seen. On September 1st, 1898, the growth was removed and examined by Dr. Jenner, and found to be a sarcoma. In April, 1899, another pigmented spot was seen, and in the following September another had appeared in the upper lid. On September 14th, 1899, the whole contents of the orbit were removed. On March 20th, 1900, the patient was very ill, and died on April 28th, 1900, but no necropsy was obtained. Mr. Lawford unfortunately did not hear of her death until some weeks later, and owing to the patient's very irregular attendance, and also to her refusing to have a radical operation in the early stage of the disease, her chances of cure were much diminished.

### Conjunctival Bridges and Pouches: Union of Retrotarsal Folds.

Major H. Herbert, I.M.S. (Bombay), described a condition found in nine upper lids of seven patients of all ages. One or more retrotarsal folds had contracted permanent adhesions with the tarsal conjunctiva, evidently while displaced downwards through swelling in some previous inflammatory attack. The adhesions were sometimes multiple along the summit of the one fold; in other cases smaller adhesions of underlying folds were found beneath the principal ones. The folds had retracted, except when held by the adhesions, thus leaving the permanently displaced portions as broad or narrow bands, or bridges of conjunctiva connecting tarsus and fornix, and freely admitting the passage of a probe beneath them. There was no history of injury in any case, but in the majority there was, or had been, trachoma. Two cases were also mentioned in which small bridges of union had formed

between folds in the lower fornix. In another patient recovering from acute conjunctivitis (membranous or pseudo-membranous) the actual formation of these adhesions was seen. The union was primarily by means of fibrinous exudation, which apparently became organized. Finally another upper lid was mentioned in which a broad fold came down over the tarsus, and had adhesions not only at its summit, but also over the greater part of its surface, leaving only a shallow pouch or pocket under each curved lateral margin.

Mr. Bishop Harman stated that he had seen a similar condition in a patient in South Africa.

### Sympathetic Irido-Cyclitis.

Mr. Sydney Stephenson communicated notes of a case of mild sympathetic irido-cyclitis in a child fifty-four days after removal of an injured eye. The interval between the original injury and the enucleation of the eye was twenty days. The injured eye was affected with sero-plastic cyclitis, but micro-organisms could not be recognized. The patient when seen sixteen and a half months after the accident had made a complete recovery.

Mr. Devereux Marshall asked Mr. Stephenson if this was a record case. He himself had seen a mild case develop between two and three weeks after an eye had been removed for injury, but he had never seen a case develop so long as fifty-four days after enucleation.

Mr. Stephenson said that he was not certain what was the longest interval observed, but he did not think that his case was a record.

### Card Specimens.

The following card specimens were shown: Mr. C. Wray: Gumma of the Orbit, which occurred forty years after primary syphilitic infection.—Mr. W. C. Rockliffe: Cystic Growth of the Retina (probably Carcinoma) Secondary to a Primary Scirrhus of the Breast. There was evidence of both eyes being affected.—Mr. Marcus Gunn: Exceptional Appearance of a Choroidal Lesion, probably Tuberculous.—Mr. Inglis Taylor: Peculiar Form of Vitreous Opacity.—Mr. Bishop Harman: Hole in Macula.

# ABSTRACTS FROM MEDICAL LITERATURE.

By W. A. SHOEMAKER, M.D.

ST. LOUIS, MO.

## ON THE OPERATIVE TREATMENT OF CORNEAL ASTIGMATISM.

A. Brewer (*Lancet*, June 1) reports good results from cauterization in corneal astigmatism. He operated only on cases in which there was a reasonable chance that the patient could do without glasses. The operation was confined to cases of mixed astigmatism and compound hyperopic astigmatism; the best results were obtained in the latter cases. An over-effect should always be produced. According to the author, the amount which is corrected seems to be less in adults than in children. He employs the ordinary platinum wire, brought to a red heat, producing a small punctate burn in the limbus, penetrating about one-half the thickness of the cornea. A more superficial burn gives only a temporary result.

## STRABISMUS AND ITS TREATMENT.

At the fifty-second meeting of the American Medical Association, held in St. Paul, Minn., strabismus and its treatment was discussed in the following order:

*Measures Other Than Operative.*—By Dr. Edward Jackson, Denver, Col. The author states that the operative treatment of strabismus is less applicable than non-operative measures. In order to bring about a perfect cure, some non-operative treatment is requisite. The objects in view are: 1. To bring about normal innervation of the muscles concerned in the movements of the eyeball, by removing abnormal requirements. 2. To keep the eyes as far as is possible upon the best plane of visual acuity, and to equalize the efforts that are required of them. 3. To eradicate abnormal ways of using the eyes, especially when one eye is used, to the practical non-use of its fellow. 4. To develop normal binocular vision. In the majority of cases, treatment should be instituted as soon as the strabismus is first noticed. The establishment and perfection of binocular vision is the aim of the non-operative treatment, and, from a practical point of

view, the correction of refractive errors, stands pre-eminent in the treatment of strabismus. The occlusion bandage, constantly and correctly applied in young children, is of value. Intelligently performed skiascopy is essential. Mydriatics are of no use unless they absolutely paralyze accommodation. Of the apparatus employed for the development of binocular vision (the primary object being to induce the patient to see with both eyes at once), Jackson prefers the fusion tubes of Priestly Smith, and especially in the form shown by him before the Section. Next to these he prefers the reflecting stereoscope as modified by Worth. Ordinary stereoscope lenses are so decentered that they practically act like prisms with bases out.

*Operative Measures.*—Dr. C. F. Clark of Columbus, Ohio, the author of this paper, calls attention to, and discusses the variety of opinions that exist among ophthalmologists: 1. As to the degree of deviation and the character of the cases which they consider proper subjects for operation. 2. As to the age at which an operation should be performed. 3. As to the choice between tenotomy and advancement. 4. As to the amount of deviation that may be safely corrected by tenotomy. 5. As to whether the operation should be confined to the eye which most constantly deviates or its effect distributed between the two eyes so as to preserve ocular balance. 6. As to full correction of the error in the first operation or delaying a portion of the operative procedure until the effect of the first division may be properly established. 7. As to the practicability of partial or graduated tentomy or advancement. 8. As to the value of orthoptic exercise before and after operation. 9. As to the value of tests made with prisms and otherwise during the progress of an operation. 10. As to the importance of the subconjunctival method of Snellen and of suturing the conjunctival wound. 11. As to the necessity of bandaging one or both eyes after an operation for tenotomy or advancement. 12. As to the relative importance of operations upon the superior and inferior recti muscles in cases of hyperphoria and hypertropia associated with lateral deviations; and 13. As to the most approved form of operation for tenotomy and advancement. The author predicts that within a few years many of those who have heretofore depended mainly upon tenotomy for the cor-

rection of strabismus will find themselves adopting the more tedious but far more conservative operation of advancement, almost as a routine practice. The peculiar insertion of the superior and inferior recti muscles should be taken into consideration. Whether tenotomy or advancement are adopted, the operative effect must be so distributed among the various ocular muscles as to preserve the control of the eyes in all ordinary movements. The well-marked heteronymous diplopia, with the images widely separated, which not infrequently results after carefully performed operations for convergent strabismus and dependent upon the presence of what is sometimes called a false macula, should not disconcert the surgeon; as it rarely causes serious disturbance, although it increases the difficulty in determining the result obtained from the operation. The author is convinced that in the operative correction of squint, advancement or resection combined with a very limited tenotomy ought, as a rule, be performed in place of a simple tenotomy.

*Its Treatment.*—Dr. A. E. Davis, of New York City, read this paper by invitation. After considering the different tests for strabismus he states that it is desirable that a uniform or standard set of tests be adopted for accurately measuring strabismus. He makes a plea for a better understanding, not only of the physiological action of the ocular muscles, but of physiology in general, by those treating cases of strabismus. He believes that in most cases of convergent squint the amblyopia is acquired and functional, and only in rare instances is it congenital. As soon as the strabismus is observed the non-operative treatment is capable of doing considerable good. By means of this manner of treatment, if instituted in time, forced fixation and suppression of the image in the squinting eye are prevented, fusion of the images assisted, and true binocular single vision frequently preserved. About 30 per cent. of all cases of strabismus may be cured simply by the non-operative treatment. As soon as non-operative measures cease to bring improvement operation should be undertaken; but if operation is delayed after this it becomes not only useless but harmful, increasing the amblyopia, because the habit of suppressing the image in the squinting eye persists. He believes that after operation the stereoscope, occlusion bandage, bar-reading, glasses, etc., are very useful. He

recommends Panas' method of operating for strabismus as safe, quick and efficient; but it should never be performed while the patient's eyes are being influenced by a mydriatic.

*The Cosmetic and Visual Results.*—Dr. J. M. Ray of Louisville, Ky., the author of this paper, believes that glasses should be adjusted to the eyes of children affected with strabismus as early as possible, depending upon the power of the parent to control the child. The glasses should always be worn for a long enough time to ascertain their effect upon convergence before an operation is undertaken. Dr. Ray considers the use of the exclusion pad and orthoptic exercises as advisable steps, principally for preserving the power of simultaneous action of the muscles when the child arrives at the proper age for operation. Parallelism of the visual lines does not mean single binocular vision, and the latter is not present in more than 7 per cent. of cases of strabismus. Cosmetic results can be produced and preserved when the power of fusion is absent, both in monocular squint attended by considerable amblyopia as well as alternating squint. In the latter variety, if the hypermetropia is high, the chances for the production of parallelism are better than when the hypermetropia is low. The amount of abduction present in the corresponding externus influences the effect of a tenotomy to a considerable degree. Two tenotomies on the same internus is to be considered as bad surgery on account of the resulting sinking of the caruncle and the divergence which later ensues. From a cosmetic point of view the operative correction of strabismus is not as simple as supposed, especially when one considers the noticeable exophthalmos and the both inward and outward limitations of the ocular excursions which sometimes follow. A study of 100 cases during the past four years showed that binocular vision was rarely produced. Glasses should always be tried, but stereoscopic exercises are of little value.

### TREATMENT OF HETEROPHORIA.

At the fifty-second meeting of the American Medical Association, held at St. Paul, Minn., Geo. M. Gould read a paper on the *non-surgical* treatment of heterophoria, and G. C. Savage one on its *surgical* treatment. Dr. Gould concludes, from experience in his private practice, that there is no surgi-

cal treatment, properly speaking, of heterophoria. For six years he has observed no case of heterophoria requiring operation, and that he has obtained satisfactory results when the cases were treated with common sense instead of with the scissors. He believes that in heterophoria accurate refraction, temporary but partial prismatic neutralization, supplemented by ocular gymnastics and the observance of ophthalmic hygiene constitute the proper treatment. He strongly advocates the non-surgical treatment of exophoria, as the following remarks will indicate: "If words are not minced, then tendon-cutting in exophoria is positive malpractice." "Surgery is the despair of medicine, and we should never adopt surgical methods while there is a glimmer of hope by natural means in the direction indicated by the subtle and adherent strivings for normality." The other ocular insufficiencies were also discussed.

Dr. Savage believes that no operation should be done in cases of heterophoria intrinsic in character when gymnastic exercises, even if required for a long time, would give relief. The two objects in view in operating on eye muscles are the alteration of the muscular tension and the change of plane of action. The existence of a cyclophoria should be first excluded. In no variety of heterophoria should a complete tenotomy ever be performed. He describes the various operations for sthenic and asthenic forms of heterophoria, with their various complications.

### EXAMINATION OF MUSCULAR INSUFFICIENCY.

Alexander Duane (*N. Y. Medical Journal*, May 25) gives the routine which he has adopted in examining the eye muscles. He says: "After making a cursory inspection of the patient to detect the presence of any obvious anomaly, I direct his attention to a cardboard sheet, a foot or more square, hanging on the opposite wall of the room. In the centre of this sheet is a round black spot, one inch in diameter. I cover the left eye with a screen, and, first making sure that he is fixing the spot with his right eye, I pass the screen quickly from the left eye to the right. In so doing I watch for any deviation taking place in either eye, and the same time ask the patient if he notices any movement of the spot. I then place prisms, appropriately directed—*i. e.*, base in for

an outward deviation, base out for an inward deviation, base up or down for a vertical deviation before the eyes, gradually increasing their strength until there is no longer any deflection behind the screen. This neutralizing prism will indicate the amount and character of the deviation as measured by the screen test. The same prism may also abolish the apparent movement of the spot, perceived by the patient. If not, I change the prism until this movement is absolutely nil, and thus measure the amount and character of the deviation by the parallax test.

"If there is any noticeable deflection behind the screen I then apply the screen test in a second way or by binocular uncovering. This well-known procedure consists in covering the left eye and then uncovering both eyes and noticing the movement that takes place. If, on thus uncovering the left eye, the right eye remains steady and the left moves into position, I know that the patient has binocular fixation, and that the deflection was a heterophoria and not a squint. If, however, the right eye should move out of its position and the left eye should move into place, I know that there is a squint and that the left is the fixing eye. If neither eye moves, I know that there is a squint and that the right is the fixing eye. By repeating this experiment with each eye alternately I can tell whether there is an habitual binocular fixation, an alternating fixation, or a uniocular squint. The diagnosis between the three may be conveniently formulated as follows:

1. "If in binocular uncovering but one eye moves, we have heterophoria and not squint.

2. "If both eyes move, or, in spite of there being an evident deviation, both eyes remain steady, there is a squint.

3. "In the latter case, if, when the left eye is uncovered, the eyes behave in the same way as they do when the right eye is uncovered (both alike moving or both alike remaining steady, no matter which eye is uncovered), the squint is alternating.

4. "If, when one eye (for instance, the right) is uncovered, both eyes move, and when the other eye (in this case the left) is uncovered, both eyes remain steady, the squint is uniocular (confined in this case to the left eye).

"I next employ the Maddox rod in the usual way, testing first for vertical and next for lateral deviations. For this, of course, I use a light as a test object. Next I employ the

phorometer (Stevens' model), and again first for vertical and then for lateral deviations. With the phorometer and Maddox tests I find, like other experimenters, that I get more accurate results if, as the patient is looking through the apparatus, I cover one eye for a few moments, then suddenly withdraw the cover and make the test before the patient has had a chance to fuse or separate the double images.

"The phorometer being still in position, I now use it in testing at near points, the test object in this case being a fine dot on a rather large card. Any object with lines in it I regard as vitiating the accuracy of the test. Using the same test object, I then make the near test with the screen and parallax just as for distance. I next ascertain the convergence near-point, using any fine object and bringing it up close to the eyes until the patient can no longer converge upon it, and then measuring or estimating the distance of the object from the root of the nose.

"Then I determine the prism-divergence (abduction) and the prism-convergence (adduction) in the usual way with prisms, held respectively base in and base out. In testing the prism-convergence it is a good plan to notice whether the accommodation is called into play as the patient converges. This can be ascertained if we use the ordinary trial card as a test object and observe how much the patient's vision is blurred by the progressive addition of prisms base out.

"Lastly, I determine the field of binocular single vision. This I do as follows: I place a red glass before the patient's right eye, and, standing at a distance of four feet, carry a candle so as to make it skirt successively all the outlying parts of the field of fixation. That is, I carry it first to the extreme right, then rather quickly back again to the middle line and on to the extreme left, then up (*i. e.*, to the up-and-left position), then back to the middle line (straight-up position) and on to the right (up-and-right position), then down to the horizontal plane, and then below it, so as to skirt the lower field in the same way as the upper. In doing this, I note whether the patient gets diplopia in any part of the field, how great the diplopia is, and what direction it tends to increase; and at the same time I watch to see whether the excursions of the eyes appear normal in all directions, or whether either eye lags behind in its motions anywhere."